

SPECIFICATION AMENDMENTS

Please insert a new paragraph on page 1 of the Specification, following the Title, as follows:

This application is a divisional of copending application serial number 09/922,446, filed on August 2, 2001.

Please replace the paragraph beginning on page 4, line 7 of the Specification with the following amended paragraph:

The foregoing problems are solved and an advance in the art is obtained by a novel magnetoresistive sensor for use in a data storage device. The sensor has a sensing ferromagnetic (free layer) that is selectively pinned using exchange biasing to define longitudinally biased magnetically responsive (active) free layer regions of a sensing element and a flux guide that magnetically connects the sensing element to a sensing surface of the sensor. The sensing element may be constructed as an MTJ device, a CPP spin valve device, or in accordance with any other suitable design. The sensing element and flux guide active free layer regions are longitudinally biased by placing a layer of exchange bias material ~~placed~~ under areas of the free layer that lie outside the track width boundaries of the sensing element, thereby pinning those areas and making them non-magnetically responsive (non-active). The sensing element and the flux guide preferably share common track width boundaries so that magnetic flux directed from the flux guide into the sensing element is not diluted with consequent loss of sensitivity. To that end, the flux guide can be formed by extending the sensing element active free layer region forwardly and rearwardly of the sensing element stripe height boundaries, such that the flux guide runs from the sensing surface of the sensor to a location that is rearward of the back edge

of the sensing element. The sensing element also includes an electrically conductive fixed ferromagnetic layer (pinned layer) and a barrier layer disposed on the pinned layer. These are in addition to the aforementioned active free layer region, which is disposed on the barrier layer. First and second electrically conductive leads and/or shields are respectively disposed to provide an electrical current generally perpendicularly through the planes of the sensing element layers.

Please replace the paragraph beginning on page 13, line 19 of the Specification with the following amended paragraph:

As shown in Figs. 4 and 6, the free layer 60 further includes a pair of lateral portions 60b lying outside the MTJ track width boundaries TW. The lateral portions 60b of the free layer 60 are exchange biased by a second antiferromagnetic layer 62 that also lies outside of the MTJ track width boundaries. The exchange bias layer 62 pins or fixes the magnetization direction of lateral portions 60b of the free layer 60. The magnetization direction resulting from this pinning is shown by the arrows 61 in Fig. 6, and is generally parallel to the sensor surface 43, in the track width direction of the sensor 42. Without pinning the free layer lateral portions 60b, ~~the~~ magnetic instability and hysteresis will degrade the performance of the active free layer region of the MTJ 53.